

IGNITION TIMING:

VACUUM ADVANCE MECHANISM

The vacuum advance is an [Ignition Timing](#) control mechanism built into some distributors. It is made up of:

- A vacuum canister,
- A linkage, and
- An advance plate attached to the trigger mechanism inside the distributor

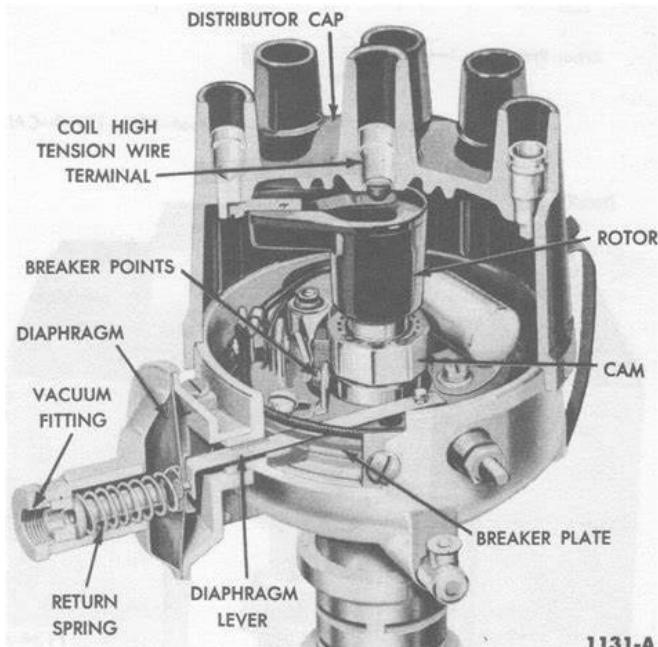


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How does the vacuum advance mechanism operate?

Vacuum advance works by using a manifold vacuum source to advance the timing at low to mid engine load conditions by rotating the position sensor (contact points, hall effect or optical sensor, reluctor stator, etc.) mounting plate in the distributor with respect to the distributor shaft.

What happens if vacuum advance doesn't work?

Eventually the deterioration will reach the point that the vacuum advance no longer adjusts the timing, causing the vehicle to hesitate when the engine attempts to move the vehicle's weight. In addition to this lack of power, a vacuum leak can also cause the engine to idle roughly or even stall.

Does vacuum advance add to total timing?

The vacuum advance provides this benefit BEFORE the Mechanical Advance provides Total Timing. The vacuum advance feature has NO EFFECT on full-

throttle power. They provide no benefit for engines that spend most of their life at high rpm (race engines). A vacuum advance unit can add up to 15 degrees of advance.

Do you need to run vacuum advance?

Depending on your idle vacuum, you need an advance can that will work with your level of vacuum. If you have low vacuum, you need a can that is fully deployed at low vacuum. You also need to limit the total amount of vacuum advance.

What happens if ignition timing is too advanced?

If ignition timing is too far advanced, it will cause the fuel-and-air mixture to ignite too early in the combustion cycle. This can cause the amount of heat generated by the combustion process to increase and lead to overheating of the engine.

How do I know if my vacuum advance is bad?

Back to your original question." What are some signs that my vacuum advance is bad?" You will have poor gas mileage and poor throttle response. As Dr. Maserati has explained, vacuum advance disappears at high RPM's... this is where the mechanical weights come into play. Ideally you want around 35 degrees total timing.

When should vacuum advance start?

If your engine idles at 10 inches Hg or less, you can start the tuning process by setting the initial timing to at least 15 degrees BTDC. If your car is equipped with an automatic transmission, placing it in gear may pull the manifold vacuum down even further.

How do you know if your timing is too advanced?

How do you know if your timing is too advanced? Symptoms of incorrect ignition timing are poor fuel economy, sluggish acceleration, hard starting, backfiring, or "pinging" or "spark knock". Too little spark advance will cause low power, bad gas mileage, backfiring, and poor performance.

What are the symptoms of bad timing?

Symptoms of a Bad or Failing Timing Belt

- You Hear A Ticking Noise Coming From The Engine.
- Your Car's Engine Won't Turn Over.
- You Notice An Oil Leak Near The Motor.

- You Experience Exhaust Issues.
- Your Revs Start Acting Up.

What should timing advance be at idle?

In addition, the WSM says spark advance should be between 6 to 18 degrees BTDC at idle.

What should timing be at idle?

Usually timing is at 5 degrees before top dead center, but sometimes there will be a vacuum diaphragm to retard the timing at idle for emissions control purposes.

How much HP does 1 degree of timing add?

2-3 hp per degree is a good rule.

What rpm do you set timing at?

3,000 – 3,500 rpm

Does timing affect idle?

Does timing affect idle speed? – Quora. Yes. In the case of both valve timing and distributor timing (in older cars with a spark distributor) changing the timing will affect the idle speed at the same throttle setting, because it will affect the efficiency of the engine at that throttle setting.

How does retarding timing affect an engine?

Ignition timing retarding causes the spark plug to fire later in the compression stroke. The effects of retarding ignition timing include reducing engine detonation, which is combustion inside the cylinders after the spark plug fires. This is also known as engine knocking.

Should timing be advanced at idle?

You NEED advance at low RPM to make that engine pull hard. It'll have MUCH better throttle response, a better idle vacuum signal, and it'll run cooler & cleaner. Your engine isn't really at "0" or Top Dead Center. The timing light is offsetting the light beam by 36 degrees, so you should be reading "0" on the crank.

Does timing affect vacuum?

The ignition or valve timing may be retarded if the vacuum is steady but lower than normal. Low vacuum can be caused by low compression, intake leak or

tight valves. If the vacuum is higher than normal, it's a sign of advanced timing.

How much vacuum should a 350 have at idle?

Idle vacuum for most engines is about 18 to 22 in. -Hg, but some may produce only 15 to 17 inches at idle. (Remember what we said about experience.) If vacuum is steady and within these ranges, the engine and fuel and ignition systems are operating normally.

Does vacuum increase with RPM?

Vacuum decreases with load, plain and simple. RPM has little or no effect.

Example 1: 4500 RPM, shut off throttle and coast in gear = high vacuum.

Example 2: 1500 RPM full throttle = no vacuum.

Where should the vacuum advance line go?

You want to plug the line to the vacuum advance when setting the timing. After setting the timing, hook the vacuum line back up and adjust your idle speed if necessary. When checking you mechanical (centrifugal) advance, the vacuum line must be plugged as well.

Should I use ported vacuum vs manifold?

Most experts suggest a stock engine run a ported connection. A hotter street driven engine should try a manifold connection. In all cases experts agree that a street driven engine should run vacuum advance.

Which is better mechanical or vacuum advance distributor?

Vacuum advance offers greater better fuel economy and engine performance due to raised timing during periods of low speed such as gear shifting or stopping; it extends the combustion mixture burn cycle. Mechanical advance timing offers better engine performance in high speed applications such as race car driving.

How do I adjust my vacuum advance?

If spark knock occurs under part throttle, an adjustment to the vacuum advance is necessary. This adjustment is made by inserting the 3/32" Allen wrench into the vacuum advance canister port and turn it two turns counter-clockwise. Test-drive the car and repeat the adjustments until the spark knock is eliminated.

How much vacuum advance is too much?

The maximum is about 14 degrees of vacuum advance. If too much advance is added, the engine will either start to knock or ping or perhaps it may surge slightly at very light throttle opening with high vacuum.

How do I adjust my Mallory vacuum advance?

To make adjustments to vacuum advance sensitivity, you remove the vacuum hose from the nipple on the vacuum canister. You insert a 3/32" Allen wrench through the nipple on the vacuum canister and turn the adjuster.

Does HEI distributor need vacuum advance?

Hook your HEI up to the ported (part-time) vac port on the pass side front metering block port. No vac at idle, so you can set your initial timing and idle speed without any vac interference. On this port, you only get vac advance when you hit the gas.

Does vacuum advance work at idle?

Plugging your vacuum advance into a direct source will allow it to engage at idle, which is good for a number of reasons. Much like cruise conditions, engines run leaner at idle than they do under load. Again, this means the mixture burns slower and needs an earlier spark to optimize the burn.

What does the vacuum line on a distributor do?

That vacuum line operates a mechanical device which moves the internals of the distributor to advance the ignition timing . The harder the engine is asked to work, the more the ignition advances.

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